

PRELIMINARY AMENDMENT

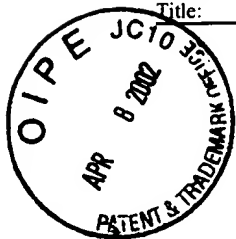
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Title: METHOD AND APPARATUS FOR COUPLING INTEGRATED CIRCUIT PACKAGES TO BONDING PADS HAVING VIAS

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Respectfully submitted,

KISHORE K. CHAKRAVORTY ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

P.O. Box 2938

Minneapolis, MN 55402

(612) 349-9592

Date March 27, 2002 By Ann M. McCrackin

Ann M. McCrackin

Reg. No. 42,858

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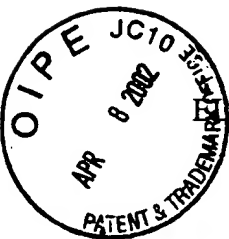
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Clean Version of Pending Claims

ELECTRONIC ASSEMBLY COMPRISING CERAMIC/ORGANIC HYBRID SUBSTRATE
WITH EMBEDDED CAPACITORS AND METHODS OF MANUFACTURE

Applicant: Kishore K. Chakravorty et al.

Serial No.: 09/650,566



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1. (Amended) A multilayer substrate to mount a die comprising:

a ceramic portion comprising an embedded capacitor having first and second terminals;

a1 a first plurality of lands on a first surface thereof, including a first land coupled to the first terminal and a second land coupled to the second terminal, wherein the first and second lands are positioned to couple to corresponding power supply nodes of the die; and

an organic portion comprising a plurality of conductors, including a first conductor coupling the first land to the first terminal and a second conductor coupling the second land to the second terminal.

2. The multilayer substrate recited in claim 1 and further comprising a second plurality of lands on a second surface thereof, including a third land coupled to the first terminal and a fourth land coupled to the second terminal.

3. The multilayer substrate recited in claim 2, wherein the pitch of the second plurality of lands is greater than the pitch of the first plurality of lands, and wherein the pitch is increased within the organic layer.

a2 4. (Amended) The multilayer substrate recited in claim 2, wherein the first plurality of lands further comprises a fifth land positioned to couple to a corresponding signal node of the die, and wherein the second plurality of lands comprises a sixth land coupled to the fifth land via a conductive path that comprises one of the plurality of conductors.

5. The multilayer substrate recited in claim 4, wherein the pitch of the second plurality of lands is greater than the pitch of the first plurality of lands, and wherein the pitch is increased within the organic layer.

A3

6. (Amended) The multilayer substrate recited in claim 2, wherein the third and fourth lands are positioned to couple to corresponding power supply nodes of an additional substrate subjacent to the multilayer ceramic substrate.

B3

7. The multilayer substrate recited in claim 1, wherein the capacitor comprises at least one high permittivity layer.

8. The multilayer substrate recited in claim 1, wherein the capacitor comprises a plurality of high permittivity layers.

9. The multilayer substrate recited in claim 8, wherein the capacitor comprises a plurality of conductive layers interleaved with the high permittivity layers, such that alternating conductive layers are coupled to the first and second lands, respectively.

10. The multilayer substrate recited in claim 1, wherein the organic portion comprises a plurality of layers, each comprising a portion of the plurality of conductors.

28. (Amended) A method for making a substrate to package a die, the method comprising:

forming a first portion of the substrate using ceramic materials, the first portion comprising at least one capacitor having first and second terminals;

forming a second portion of the substrate using organic materials, the second portion comprising a plurality of conductors therein, including a first conductor coupled to the first terminal and a second conductor coupled to the second terminal; and

forming a first plurality of lands on a surface of the second portion of the substrate, including a first land coupled to the first conductor, and a second land coupled to the second conductor, wherein the first and second lands are positioned to couple to first and second power supply nodes of the die.

A4

B4

29. (Amended) The method recited in claim 28, wherein forming the first portion comprises forming a first signal node, wherein forming the second portion comprises forming a third conductor coupled to the first signal node, and wherein forming the first plurality of lands comprises forming a third land coupled to the third conductor, the third land being positioned to couple to a signal node of the die.

30. The method recited in claim 28 and further comprising:
forming a second plurality of lands on a surface of the first portion of the substrate, including a third land coupled to the first terminal, and a fourth land coupled to the second terminal, and wherein forming the second portion comprises fanning out the plurality of conductors from a first pitch of the first plurality of lands to a second pitch of the second plurality of lands.